# Wicked problems in designing open online learning

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**Abstract**: This paper will report on the "wicked" problems encountered when designing an online course with bounded content in an unbounded learning environment. It will describe the dilemmas faced and decisions made by academics in an Australian university challenged by an institutional initiative to design radical, disruptive learning experiences making use of readily available online media. This bounded/unbounded environment demands new roles for instructors in adopting innovative pedagogies and teaching and learning strategies. It also creates changing and challenging roles for course designers as they deal with ill-defined parameters and unknown audiences. In this paper, we propose a novel methodology for making curricular decisions in ill-defined spaces.

## Introduction

There is much said about the potential of the Internet to enhance learning. There have been well-documented and successful forays into this space over the past decade particularly in higher education (Adams, Liyanagunawardena, Rassool, & Williams, 2013) along with a parallel growth in participation in free online "taster" courses with voluntary participation, optional assessment and no academic credit (Trounson, 2013). These learning environments, based on an understanding of and an intention to make the most of the profound changes in information sharing and communication brought about by digital technology (Thomas & Seely Brown, 2011), are typically supported by learning management systems and make use of an array of synchronous and social media tools to encourage personal expression and the formation of communities.

The best known of these environments are MOOCs (Massive open online courses) and, despite a view of these as change agents in higher education, peer-reviewed research into their effectiveness remains "growing but limited" (Liyanagunawardena, Adams, & Williams, 2013, p. 219). It is clear that this is a relatively new way of offering learning experiences that has far-reaching implications for the bricks-and-mortar institutions (Staley, 2013). It must be accepted, however, that these courses have maintained many of the same characteristics, such as pre-determined start and finish times, a predetermined sequence and an identified teaching team.

In 2013, the Queensland University of Technology launched its Digital Transformation Project, designed to explore some different approaches to teaching and learning – not only to the technologies employed but also in how learning is packaged and presented. The university wanted to break the mold in terms of how its offerings were locked into predetermined semester lengths and sequences. It also wanted to capture the excitement around MOOCs and 'taster' courses as well as working out a way to respect its learners and allow them self-directed options. The envisaged design was to be both bounded and unbounded, relaxed yet rigorous. In short, we were asked to build a bounded environment where the rules of engagement were completely unbounded, to move from "the stable structure of the twentieth century to the fluid infrastructure of the twenty-first century" (Thomas & Seely Brown, 2011, p. 17).

Conceptually, this was exciting and we readily agreed to accept the challenge. The task, however, quickly represented itself as a set of wicked problems that were progressively revealed to us. In our understanding and as relevant to the curriculum design challenge we were given, wicked problems: are difficult to clearly define, have many interdependencies and are often multi-causal, are often not stable, have no clear solution, are socially complex, and often lead to unforeseen consequences (Australian Government, 2007).

This paper will describe how its authors defined and responded to the wicked problems they faced in the context of educational leadership and management. It will share the design strategy we derived to define the ill-defined drawn from research literature and our prior experience.

## The dilemma

The course, using the term loosely, was to be called *Digital Leadership* and was part of a larger suite related to Education Leadership and Management. Both were conceptually drawn from an existing Graduate Certificate of Education program whose students were typically teachers or system leaders interested in extending their knowledge, or gaining formal qualifications necessary for promotion. An additional incentive for our current students is to build the skill set required to progress through the career stages of the newly introduced Australian Professional Standards for Teachers (AITSL, 2011b).

At its simplest, the bounded/unbounded course had to be online using readily available tools and had to be in "learning bites" or fluid components so that learners could interact with the content and others in a free-flowing space. Further, it was to be both ordered and happenstance – the best of self-directed and self-generative learning with the elasticized-edge structure of a MOOC and the possibility of building and sustaining a community. This duality of bounding and unbounding was the first wicked problem we encountered. As teacher educators used to teaching online, we knew what worked well in the context of in-service post-graduate courses, namely, guided reading, provocation, discussion and reflection. What was less clear was how to transpose these "signature pedagogies" of our discipline (Laurillard, 2012) into the curious bound: unbound continuum of the Digital Transformations Project.

The second problem arose from the absence of guidance of the length of the experience or how many learners might be expected to engage or the depth to which they might engage and, in turn, the absence of extant models to follow. For example, contemporary course design methodologies such as the *Understanding by Design Framework* (Wiggins & McTighe, 2005) were of little utility. Similarly, the very nature of the design brief meant that we could not begin with clearly defined outcomes nor could we design sequenced learning activities and experiences that would lead to this. We wrestled with what our students would do, or even, in fact what we might call them. We wondered if these participants might just do what/when they wished but record their activities electronically for their own future reflection or for academic credit. If credit was to be applied, was an assessment item to be set and, if so, how might it be scaffolded or assessed? Who would receive the completed assessment item, who might assess it and where might the outcome be recorded? Would a mark be given or only formative remarks? If the participants were not articulating to formal qualifications, they would have experiences, conversations, thoughts based on our prompts but we would never know any of this. The excitement of an unbounded space suddenly felt like a vacuum.

## Towards a solution

We decided to ignore content and the technologies we might use and think firstly about structure. We began by identifying the domains to be addressed namely, the discipline, the context, the articulation, the qualification, the cohort, and the nature of the participation. We then positioned these domains on a continuum of institutional/instructor control from bounded to unbounded. Figure 1 shows our initial mapping along with the specific details, that is, of how the domain was interpreted in the context of the Digital Leadership course.


*Figure 1*. The bounded/unbounded continuum of the Digital Leadership course

We then experimented with mapping the identified domains to the "circumstances" of curriculum design (Lloyd, 2013), a seemingly simple question-based approach which has its origins in ancient times. Hermagoras of Temnos, a 1st Century BC rhetorician and teacher of rhetoric in Rome, is said to have divided topics into seven circumstances. These are: Who/*Quis*; What/*Quid*, When/*Quando*, Where/*Ubi*, Why/*Cur*, In what way/*Quem ad modum*, and By what means/*Quibus adminiculis*. We believed that this would help us fill in some of the missing details or, at least, provide us with the opportunity to identify the unknowns and reveal the wicked problems ahead of us. We enjoyed the irony of using an ancient framework to address a problem in the digital present.

**Who/*Quis***

The "who" was represented by the Cohort domain in Figure 1, which rests towards the unbounded end of our continuum. As noted, we did not know how to refer to those who would engage with the course we were building. Were they students, participants, or visitors? Anyone could choose to engage with Digital Leadership and, unlike a typical university course, we would not be able to gauge nor specify their prior experience, capacity, or technical competence. To aid us in dealing with this wicked problem, we created a persona (Grudin & Pruitt, 2002) based on our experience of our in-service postgraduate students. Personas are used in software design to model the expected (but unknown at the design stage) users of the software and their interaction with it. Cooper (1999) described personas as "hypothetical archetypes … defined with significant rigor and precision" (p. 123). The created persona of our Cohort was a mid-career educator studying around work and family commitments. He or she, but most frequently "she," would have access to and functional ability with technology but, typically, would not be regular contributors to social media (though a minority of post-graduate in-service students were passionate posters on Twitter). With a few exceptions, our students were Australian and native English speakers. The MOOC research shows that although the original intention of many MOOCs was to reach a more diverse and widely distributed cohort of learners, the majority of participants to date have been from North America and Europe (Liyanagunawardena et al., 2013). Another wicked problem emerged in our not knowing if our participants would remain predominantly Australian or was the mix likely to change and were we to expect participants from anywhere around the world, Further, we could not assume leadership experience, but decided that we should design activities that allowed the participants to reflect on presented case studies, perhaps integrating their experience where possible. The participants were, irrespective of location. expected to be motivated by career progression, and therefore we needed to ensure the content was practical and relevant to the workplace. International participants should be able to map the Australian Standards to their professional standards if available, for example, the ISTE NETS-T (ISTE, 2012). At the least, the activities needed to encompass generic understandings transferable to other educational settings.

**Why/*Cur***

The participant's motivation was presumed from our imagined persona. That is, as noted, participants would typically be motivated by career progression and the need for Continuing Professional Development. They might be starting to take a leadership role in their workplace and they might be looking for guidance, a sharing of ideas and practical advice. They might also be interested in theory-based frameworks or in obtaining formal qualifications to support applications for promotions. The motivation for the University was experimental, a wish to play in new spaces. The motivation for the authors/designers, immersed in digital technologies in education, was to marry content to context and to develop and articulate a curriculum design strategy.

**What/*Quid***

If "what" was positioned on our continuum (Figure 1), it would be at the bounded end. Selecting the content was, in many ways, the simplest of the decisions confronting us. This positioning and its inherent simplicity were deceptive, however, in that it had to appear to the participants as unbounded and that the choices, particularly in regard to sequence, were theirs. We began by describing the knowledge and experience expected at Masters/Graduate Certificate level in the field of Digital Leadership. We decided that the bounded content would be guided, in the main, by the *Australian Professional Standards for Teachers* (AITSL, 2011b) and the *Australian Professional Standard for Principal*s (AITSL, 2011a). We needed to acknowledge that the content and subsequent learning activities had to be of an intellectual rigor commensurate with the Masters/Graduate Certificate level, defined in Australia by the Australian Qualifications Framework (AQF) at Levels 8 and 9 (AQF, 2012a, 2012b). There was also the chance that the course might be used for articulation or credit into more formal studies, so optional assessment (at an appropriate level) needed to be in place. These considerations had clear connections to the Discipline, Context, Articulation, and Qualification domains listed in Figure 1.

**When/*Quando***

The "when" was tied to the Participation domain positioned at the extreme unbounded end of the continuum (Figure 1). There was no fixed time, no fixed sequence, no starting or end date. We formulated a scenario, based on our persona, which dictated that each "learning bite" had to be asynchronous and perhaps occupy four to six hours of time, perhaps in two or three visits. We had to add a boundary to the unbounded.

**In what way/*Quem ad modum***

"In what way" was also aligned with the Participation domain and thus sat at the extreme unbounded end of the Figure 1 continuum. We presumed that there would be multiple ways that a participant could engage with the course. It could be as superficial as flicking through the pages of a magazine or as intense as preparing a dissertation. In curriculum design terms, we needed to create a "low entry, high ceiling" environment which allowed participation at differing levels. We opted to include a critical reflection task that might be seen as an interesting dilemma to consider or informally discuss with others in their workplaces, or, alternately be expanded into a written text for assessment. The keyword was *agility*. The critical tenet for was *rigor* (in line with our AQF demands) in that we wanted even the most fleeting of interactions to pose an intellectual challenge. The pedagogy we needed to adopt was akin to that of the design studio where "learning cannot be pre-determined by teaching" (Rohse & Anderson, 2006, p. 82) and there was an acceptance by both instructor and participant that "learning accepts uncertainty, serendipity and happenstance as part of the nature of education, wherein the solutions are intentionally incomplete" (Crowther, 2013, p. 19).

**Where/*Ubi***
"Where" related to the nature of the Participation. A face-to-face or blended unit would require the identification of a physical space in which learners and instructors would meet. There would be a consideration of the number of learners, their ability to be present in this space at the chosen time and the resources available to them in the space. The online space in this course design had similar considerations, and these led to a consideration of "By what means," that is the nature of the interactions and the technologies that could support this, as elaborated below.

**By what means/*Quibus adminiculis***
The 'By what means' circumstance brought us to the selection of technologies and platforms to be employed. It would direct participants to the media we selected. We had to eschew synchronous technologies because we did not know who would be in the virtual spaces we were building at any one time (if anyone was there at all), what was their goal or how long they may stay. Further, as noted as one of the wicked problems that was first revealed to us, we had no way of ascertaining participants' access to online platforms and communications media. We did not, and could not, know whether or not they were comfortable or familiar with social media or whether they wished to use existing personal accounts for work and study based activities. And yet, we needed to be choosing technologies to match the participants' needs and available resources.

We did not– and could not– know where they would go next, or indeed, where they had come from. So, we needed to opt for self-generating time capsules – disconnected conversations through asynchronous media and disembodied sharing to an unknown world in the form of broadcasts. These technologies, however, needed to be a cohesive whole to the participant so that they had a full record of their engagement and the opportunity for later reflection, addition of new knowledge or, if needed, an utter recant of previous pronouncements! The opportunity to learn from others was possible; the opportunity to learn with them was a situation we could build for but not promise.

## The suggested solution

The analysis and considerations presented led to the proposal of four nominally-numbered components which align with the described circumstances and satisfy the listed domains (Figure 1). At time of writing, we had devised the structure of the course but were still unsure, awaiting institutional decisions, of the exact platforms that would be used. The following provides an overview of these four components.

**Component 1: Sharing stories of digital leadership**

*Aim(s)*

- To engage with a real example of digital leadership in an Australian school setting
- (Optional) Awareness of LPP3.1 (Standard for School Principals) which states that:
  - Work with the school community to promote and sustain school improvement informed by school effectiveness research.
  - Lead and facilitate through teams the necessary innovation and change to reflect changing demands on and expectations of the school and use project management to foster both efficiency and effectiveness in achievement of goals.
  - Take a strategic role in the development and implementation of new and emerging technologies to enhance and extend teaching and learning experiences.

*Activities*

| | | |
|---|---|---|
| 1. | Guided reading | Hayward, R. (2008). Leading a digital school: A case study - St. Leonard's College. In M. Lee & M. Gaffney (Eds.), *Leading a Digital School: Principles and Practice* (pp. 80-92). Camberwell, Victoria: ACER Press. |
| 2. | Guided listening | Podcast by author which updates "story" described in the reading |
| 3. | Sharing (blog) | What are your experiences of digital leadership?<br>Could the St Leonard's approach work in your school/educational setting?<br>What questions would you ask the school leaders, teachers or students in the years following the initial redesign |

**Component 2:** Analysis and evaluation of digital leadership

*Aim(s)*

- To engage with a real example of digital leadership in an Australian school setting
- To demonstrate an understanding of how educational technologies can scaffold curriculum change
- (Optional) Awareness of LPP3.1 (Standard for School Principals) *Work with the school community to promote and sustain school improvement informed by school effectiveness research. Lead and facilitate through teams the necessary innovation and change to reflect changing demands on and expectations of the school and use project management to foster both efficiency and effectiveness in achievement of goals. Take a strategic role in the development and implementation of new and emerging technologies to enhance and extend teaching and learning experiences.*

*Activities*

1. Familiarisation — Visit the website of Northern Beaches Christian School, in Sydney, Australia. <www.nbcs.nsw.edu.au>
   Look through its pages
   Pay particular attention to the Technology page <www.nbcs.nsw.edu.au/our-school/technology>
2. Guided reading — A number of research papers written by Stephen Harris, the school's principal will be provided. Refer also to <scil.com.au/about/research>
3. Reflection — Compare the Northern Beaches Christian School to your academic institution
   - What are the main similarities and differences?
   - What ideas might you like to adopt, and how might they need to be adapted for your setting?
4. Assessment (Optional) — Prepare an academic essay of 3000 words which explains how philosophy and pedagogy are enacted through a digital environment. Suggest which technologies might be selected to afford the outlined changes in student learning outcomes and/or teacher pedagogy. You may base your essay on sections of the Northern Beaches Christian School or another learning environment with which you are familiar. Specific guidance will be given as how to construct an academic essay. Assessment criteria will also be provided.

**Component 3: Join a professional community, learn from/with others**

*Aim(s)*

- To engage in self-generated professional learning
- (Optional) Achievement of Australian Professional Standards for Teachers at the career stage best suited to you.
  - APST 4.5: *Use ICT safely, responsibly and ethically Review or implement new policies and strategies to ensure the safe, responsible and ethical use of ICT in learning and teaching*.
  - APST 7.4: *Engage with professional teaching networks and broader communities. Take a leadership role in professional and community networks and support the involvement of colleagues in external learning opportunities*.

*Activities*

1. Familiarisation — Join *Scootle Community* <www.scootle.edu.au> <community.scootle.edu.au>
2. Guided participation — "Unpack" what APST 4.5 means in your learning environment. Safety, responsibility and ethics are complex undertakings. Become familiar with the policies from your jurisdictions and share your understandings with your professional peers. Listen and respond to the experiences of others.
3. Reflection/action
   - Record your new understandings.
   - Record what being in this community has meant to you and to how you have gained your new understandings.
   - Document any actions you have taken in your school setting to meet APST 4.5
   - Conduct a PMI on the experience of being part of an online professional community

**Component 4: Unpacking what is expected of educational technologies in the classroom**

*Aim(s)*

- To map personal achievement and understanding of ICT in the classroom at different career stages
- (Optional) Achievement of Australian Professional Standards for Teachers at the career stage best suited to you.
  - APST 2.6 Lead and support colleagues within the school to select and use ICT with effective teaching strategies to expand learning opportunities and content knowledge for all students.

*Activities*

- Guided reflection
  - Take careful note of the four career stages of the Australian Professional Standard for Teachers 2.6
  - Deconstruct and illustrate (in a context familiar to you) what is intended at each stage.
- Action plan — Devise a personal action plan. For example
  - If you are supervising/mentoring pre-service or beginning teachers (at the Graduate career stage), what might you expect to see? What evidence would you ask?
  - If you are a Highly Accomplished teacher, what might you need to do/demonstrate to move to the Lead Teacher stage?
- Sharing (blog) — Share your illustrations and plans with others.

Cumulatively, we believed that these four components would suit the persona we had described. The course was grounded in the Australian context but we believed that there would be enough of generic teacher competencies and connection to authentic practice to transcend its location. We left much of the learning to the learner and, in only one instance, have we prescribed an activity, that is, the academic essay in Component 2.

## Conclusion

The purpose of the QUT Digital Transformation Project was build a "fluid infrastructure" (Thomas & Seely Brown, 2011) to tap into the MOOC ideal of reaching a more diverse and widely distributed cohort of learners. This presented a wicked problem to the authors as course designers due, as noted, to the deliberately ill-defined and open nature of the project. There were many unbounded factors and wicked problems that forced us to be creative in our approach to course design – the challenge was to design in ill-defined spaces. This resultant framework for innovative course design is in its infancy and needs further development, however we believe it could be a useful methodology to embrace the wicked problem and the fluid infrastructure of the 21st century learning environment.

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